

WHAT IS CLAIMED IS:

1. An ultrasound receiver assembly for use in a presentation board digitizer system, the receiver assembly comprising:

- (a) a first ultrasound receiver located adjacent to the surface of the presentation board; and
- (b) a second ultrasound receiver displaced from said first ultrasound receiver in a direction substantially perpendicular to the surface of the presentation board,

said first and second ultrasound receivers being connected so as to generate a total output signal corresponding to the instantaneous sum of the ultrasound signals received at each of said first and second ultrasound receivers such that the receiver assembly is most sensitive to ultrasound signals incident from a plane substantially adjacent to the presentation board.

2. The receiver assembly of claim 1, wherein said first and second receivers are connected in series.

3. In an ultrasound-based digitizing system for identifying the position of an ultrasound transmitter associated with an element movable relative to a surface, the system having at least three spaced apart ultrasound receivers associated with the surface, a method of analyzing outputs from the ultrasound receivers comprising the step of identifying as a current position a weighted centroid of at least a first calculated position derived from the outputs

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- (a) a handle;
 - (b) an eraser element having a substantially flat eraser surface; and
 - (c) a plurality of contact microswitches located on said eraser surface, such that when a portion of said eraser surface contacts the presentation board, at least one microswitch corresponding to said portion is activated and such that when substantially an entirety of said eraser surface contacts the presentation board, substantially all of said microswitches are activated.

17. The narrow-band eraser device of claim 16, further comprising a plurality of ultra-sound transmitters and a plurality of infra-red transmitters for identifying contact with the presentation board.

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18. The narrow-band eraser device of claim 17, further comprising at least one reflector for each of said transmitters.

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19. The narrow-band eraser device of claim 16, further comprising a pressure-sensitive element for identifying contact with the presentation board.

of a first pair of the receivers and a second calculated position derived from the outputs of a second pair of the receivers, wherein the weighting varies as a continuous function of approximate position relative to the ultrasound receivers.

4. The method as in claim 3, wherein the ultrasound receivers are substantially collinear, and wherein the weighting varies linearly with distance in the direction of alignment of the ultrasound receivers over at least a given switch-over zone.

5. The method as in claim 3, wherein the weighted centroid approximates to said first calculated value when the movable element is within a first given region of the surface.

6. A presentation board digitizer system for digitizing operative strokes of a drawing implement carrying an ultrasound transmitter against the board, the system comprising:

- (a) at least two ultrasound receivers mounted relative to the board for receiving air-borne ultrasound signals;
- (b) a transducer associated with the board so as to detect vibrations from the transmitter conducted through the board; and
- (c) a processor responsive to outputs from said at least two ultrasound receivers to calculate a current position of the transmitter, said processor being additionally responsive to an

output from said transducer to identify contact between the drawing implement and the board, thereby identifying operative strokes of the drawing implement.

7. A transmitter device for use with a system for digitizing operative strokes of a hand-held drawing implement, the drawing implement having a body and an operative tip, the transmitter device comprising:

- (a) a housing having a substantially cylindrical opening terminating at a first end in a surface with a central bore, said housing receiving a portion of the body of the drawing implement with its operative tip extending from said central bore;
- (b) a retainer attachable to a second end of said opening to retain the drawing implement within said housing, said retainer having a spring element for biasing the drawing implement towards said surface; and
- (c) a transmitter mounted relative to said housing proximal to said central bore.

8. The transmitter device as in claim 7, wherein said housing further includes:

- (a) a microswitch actuated by changes in pressure exerted on said surface so as to be responsive to a force exerted on the operative tip of the drawing implement towards said housing; and

- (b) electronic circuitry responsive to said microswitch to affect operation of said transmitter at least when said microswitch indicates a force exerted on the operative tip of the drawing implement towards said housing.

9. The transmitter device as in claim 8, wherein said electronic circuitry operates said transmitter for a given time interval after said microswitch ceases to indicate a force exerted on said outer housing towards the operative tip of the drawing implement.

10. The transmitter device as in claim 9, wherein said given time interval is at least about half a second.

11. The transmitter device as in claim 8, wherein said transmitter transmits continuously, and wherein said electronic circuitry is responsive to said microswitch to change a signal transmitted by said transmitter while said microswitch indicates a force exerted on the operative tip of the drawing implement towards said housing.

12. The transmitter device as in claim 8, wherein said transmitter is an ultrasound transducer.

13. The transmitter device as in claim 12, further comprising elements of an electromagnetic communications link, said elements being associated with said electronic circuitry.

14. An ultrasound transmitter device for use with a system for digitizing the position of a hand-held drawing implement, the drawing implement having a central axis and an operative tip, the transmitter device comprising a substantially cylindrical piezoelectric transmitter element positioned coaxially with the drawing implement so as to circumscribe a part of the drawing implement proximal to the operative tip.

15. An eraser device for use with a presentation board digitizer system, the eraser device comprising:

- (a) a handle;
- (b) an eraser element having a substantially flat eraser surface; and
- (c) a pivot joint connecting between said handle and said eraser element, said pivot joint having two degrees of rotational freedom such that, in use, said eraser element assumes an orientation with said eraser surface parallel to the presentation board surface substantially independent of the orientation at which said handle is held.

Sub C! 16. A narrow-band eraser device for use with a presentation board digitizer system, the narrow-band eraser device comprising: